

REMARKS

STATUS OF THE CLAIMS

Claims 1-2, 9, 15-16, 31-33, 66, 69-70, and 77 are pending in the application. All other claims are cancelled. Cancellation of various dependent claims introduces no new matter. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter or agreement with any objection or rejection of record.

REJECTIONS UNDER 35 USC 112—ENABLEMENT

Claims 1-2, 9, 15-16, 31-33, 66, 69-70, and 77 were rejected under 35 USC 112, paragraph 1(enablement). To the extent that the rejections apply to the amended claims, Applicants respectfully traverse.

The rejection argues that the application does not teach antisense control of carotenoid accumulation via non-identical antisense sequences. The claims have been amended to delete dependent claims, rendering this issue moot. Antisense regulation is not at issue in the pending claims.

The rejection argues that it would not be possible to optimize carotenoid biosynthetic polypeptides, because the pineapple carotenoid enzyme sequences, allegedly, were not provided by sequence. Applicants respectfully note that pineapple sequences, *per se*, are not being claimed. Furthermore, applicants certainly taught how to obtain pineapple sequences, which would allow optimization towards the endogenous sequences, if desired.

However, this issue is not ultimately relevant. Expression of an enzyme in the carotenoid pathway in a plant cell affects carotenoid biosynthesis *whether or not it has any structural relationship to the endogenous pineapple enzyme*. That is, a “carotenoid biosynthetic polypeptide,” e.g., a carotenoid enzyme, acts on a carotenoid molecule or precursor thereof to transform it. The introduced enzyme does not rely on structural similarity to a pineapple enzyme for this activity.

To illustrate this, Applicants provide, herewith, a color figure showing the results of introducing the tangerine phytoene synthetase gene into pineapple, as taught in the application in Examples 1-2 (see application, starting at paragraph 166). As the

figure illustrates, pineapple transformed with the tangerine phytoene synthetase gene display a clear change in carotenoid accumulation, i.e., as evidenced by a much darker gold coloration, than the does regular fruit (in the attached figure, the regular production fruit is noted “normal MD-2;” the golden fruit below comprise an introduced tangerine phytoene synthetase gene).

Clearly, pineapple, being a *monocot*, is evolutionarily quite unrelated to tangerine, a *dicot* tree fruit. Nevertheless, the heterologous tangerine phytoene synthetase has the activity in pineapple as taught by the Applicants; i.e., expression of the heterologous gene results in increased carotenoid accumulation in pineapple. Given the evolutionary divergence between pineapple and tangerine, it is clear that a wide variety of carotenoid biosynthetic polypeptides, e.g., as taught extensively in the application (para. 75-90) are functional in pineapple.

The rejection must be withdrawn.

WRITTEN DESCRIPTION

Claims 1-2, 8-9, 15, 16, 31-33, 39, 43, 66, 69, 70, 77 and 97-106 were rejected for alleged lack of written description. Applicants respectfully traverse.

The action makes various arguments that relate to the activity of antisense constructs. Without conceding to the arguments in any way, Applicants respectfully submit that the ability of antisense constructs to suppress carotenoid biosynthesis is moot. As claim 1 requires, the relevant regulator is “at least one carotenoid biosynthetic polypeptide.” Antisense constructs are not at issue in the amended claim set.

The term “carotenoid biosynthetic polypeptide” is defined in the specification as:

“a biocatalyst or enzyme that catalyzes at least one step in the carotenoid biosynthetic pathway. Carotenoid biosynthetic polypeptides include, e.g., geranylgeranyl pyrophosphate synthases, isopentenyl diphosphate isomerases, phytoene synthases, phytoene desaturases, ζ -carotene desaturases, lycopene β -cyclases, lycopene ϵ -cyclases, β -carotene hydroxylases, ϵ -hydroxylases, and the like.”

Para. 39.

Thus, issues regarding an antisense sequence-- which, of course, are not enzymes—are not relevant to the claimed invention.

More importantly, Applicants clearly do teach a wide variety of enzymes that fall within the scope of the term "carotenoid biosynthetic polypeptide." See, Application at paragraphs 75-90. Moreover, as noted above, widely divergent biosynthetic polypeptides function as expected in carotenoid pathways in pineapple. Accordingly, Applicants were "in possession" of the *claimed* invention.

The rejection must be withdrawn.

TERMINAL DISCLAIMER AND DOUBLE PATENTING

Applicants note that a terminal disclaimer will be filed, overcoming the obviousness-type double patenting rejection with respect to USSN 10/536,885, once the claims are otherwise in condition for allowance, assuming a disclaimer is appropriate at that time. Please contact the undersigned to arrange for expedited submission of a terminal disclaimer.

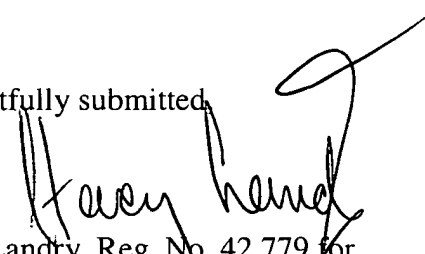
CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the claims are deemed not to be in condition for allowance after consideration of this Response, a telephone interview with the Examiner is hereby requested. Please telephone the undersigned at (510) 337-7871 to schedule an interview.

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Respectfully submitted,


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Attachments:

- 1) A transmittal sheet;
- 2) A Fee Transmittal sheet;
- 3) A receipt indication postcard;
- 4) Appendix A: Figure of transformed pineapple;
- 5) Notice of Appeal.

Appendix A



Normal MD-2